

Transperitoneal Laparoscopic Cystoprostatectomy for Muscle Invasive Bladder Cancer: Results and Oncologic Outcomes in a Single Center in Douala Cameroon

Cyril Kamadjou^{1,2}, Divine Enoru Eyongeta³, Annie Wadeu Kameni¹, Herve Moby Mpah², Justin Kamga⁴, Bertin Njinou Ngninkeu¹, Fru Angwafo⁵

¹Medico Surgical Center of Urology and Mini Invasive Surgery, Douala, Cameroon

²Faculty of Medicine and Pharmaceutical Sciences, Department of Surgery and Specialities, University of Douala, Douala, Cameroon

³Regional Hospital Limbe, Limbe, Cameroon

⁴General Hospital Yaounde, Yaounde, Cameroon

⁵Faculty of Medicine and Biomedical Sciences, University of Yaounde, Yaounde, Cameroon

Email: cyrkamadjou@yahoo.fr

How to cite this paper: Kamadjou, C., Eyongeta, D.E., Kameni, A.W., Mpah, H.M., Kamga, J., Ngninkeu, B.N. and Angwafo, F. (2022) Transperitoneal Laparoscopic Cystoprostatectomy for Muscle Invasive Bladder Cancer: Results and Oncologic Outcomes in a Single Center in Douala Cameroon. *Surgical Science*, 13, 529-540.

<https://doi.org/10.4236/ss.2022.1311061>

Received: July 22, 2022

Accepted: November 27, 2022

Published: November 30, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background and Aim: Radical cystectomy is the treatment of choice for muscle-invasive bladder cancer. Although open surgery is currently the gold standard for this procedure, it can also be done via laparoscopy. We aimed to evaluate the oncologic results and the place of laparoscopic cystectomy in the management of bladder cancer in a single urology center in Douala, Cameroon. **Patients and Methods:** This is a prospective, single-center study carried out from 2015 to 2019. We included 12 patients (ten men and two women) with bladder cancer who underwent total radical laparoscopic transperitoneal cystectomy with ilio-obturator lymph node dissection. Data on patients' demographic characteristics, pre-operative and postoperative clinical parameters and workup results, and surgical outcomes were collected to determine the overall survival using a Kaplan-Meier curve. **Results:** We recruited ten men and two women with a median age of 61.5 [52.8 - 68.5] years. The mean tumor diameter was 3.75 ± 1.06 cm. Three (25%) patients received adjuvant chemotherapy while eight did not. The mean surgery duration was 242 ± 45.85 minutes. Blood vessels and nerves were preserved in four (33.33%) patients during surgery. Transitional cell carcinoma was found in 10 (83.33%) patients while epidermoid carcinoma was found in two (16.67%) patients. Metastasis occurred in four (33.33%) patients while the

tumor recurred in two (16.67%) patients who later died. Bricker's ileal conduit urinary diversion was performed in 10 (83.33%) patients while the Studer neobladder was used in two (16.67%) patients. The mean duration of hospitalization was 6 ± 1.48 days. Only one patient (8.33%) developed a post-operative complication. Six (50%) of the patients died while six survived. The median overall survival was 486 days and the five-year overall survival rate was 46.47%. **Conclusion:** Laparoscopic cystectomy is a mini-invasive technique associated with good cancer control. When performed by well-trained staff using specialized equipment, it can be a safe and effective method of managing muscle-invasive bladder cancer.

Keywords

Laparoscopic Radical Cystectomy, Bladder Cancer, Overall Survival, Urinary Diversion

1. Introduction

In urology, the main indication for radical cystectomy is muscle-invasive bladder cancer (MIBC) [1]. Radical cystectomy for MIBC is often accompanied by pelvic lymph node dissection (PLND). Extended PLND can potentially improve survival through the eradication of micrometastatic disease and improved pathologic staging since at the time of cystectomy, up to 25% of patients harbor lymph node deposits [2]. The first ever radical cystectomy was performed in 1887. Since then, open radical cystectomy has been the gold standard treatment for muscle-invasive bladder cancer (MIBC) [3]. A CT image of an invasive bladder tumor and an endoscopic view of a bladder tumor with extension into the urethra are shown in **Figure 1**.

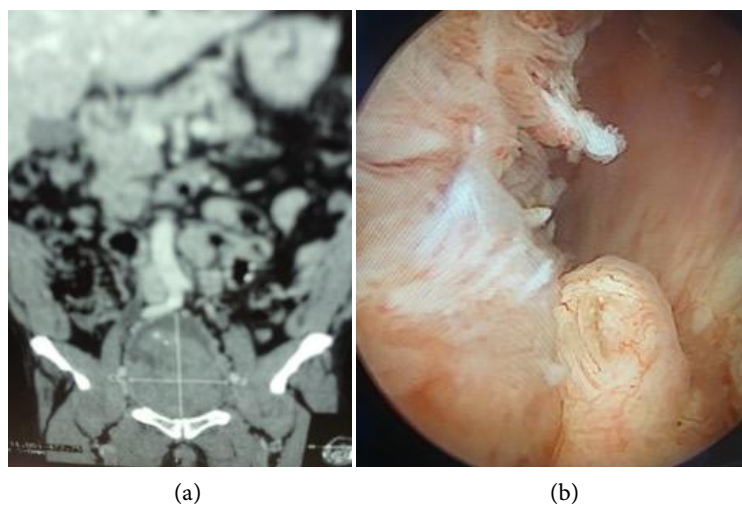


Figure 1. (a): CT image of an invasive bladder tumor; (b): Endoscopic view of a bladder tumor with extension into the urethra ($\times 50$ magnification).

With the advent of laparoscopic surgery, the first laparoscopic radical cystectomy was performed in 1993 [4]. However, despite the advent of laparoscopic surgery in urology, open radical cystectomy with lymphadenectomy (ORCL) has remained the treatment of choice for MIBC mainly because the long-term functional and oncologic outcomes of patients who underwent laparoscopic radical cystectomy with lymphadenectomy (LRCL) have been under investigation ever since [3]. Nevertheless, in 2012, Aboumarzouk *et al.* predicted that LRCL will one day be a viable alternative to ORCL once the steep learning curve is overcome [5]. With the recent advancements in knowledge and technology, LRCL is carried out more frequently and with spectacular results [6]. In 2015, Nosov *et al.* reported that major complication rates were similar between open radical cystectomy and laparoscopic radical cystectomy and that laparoscopic cystectomy was associated with a lower rate of minor complications than open cystectomy. They also reported that it was safer and associated with lower blood loss, decreased postoperative ileus, and lower length of stay compared with open radical cystectomy [7]. However, in resource-limited settings such as sub-Saharan Africa, laparoscopic procedures are not commonly performed. Thus, our study aims to demonstrate the efficacy, safety, and outcome of LRCL in a single urology center in Douala, Cameroon.

2. Materials and Methods

This is a prospective study carried out at the *Centre medico-chirurgical d'urologie* in Douala, Cameroon, from 2015 to 2019. We included all patients with muscle-invasive bladder cancer who were scheduled to undergo LRCL at our center. We excluded patients with incomplete medical records and patients who were discharged against medical advice. In the end, 12 eligible patients were included in our study. We obtained patients' information by directly interviewing them and consulting their clinical records. We collected relevant data on each patient's age, sex, tumor size, American Society of Anesthesiologists classification, tumor location, presence or absence of neoadjuvant chemotherapy with cisplatin, histological classification before surgery, surgery duration, blood loss during surgery, histological classification after surgery, presence or absence of metastases, locations of metastases if present, preservation or not of blood vessels and nerves, type of derivation (Studer or Bricker) done, postoperative complications encountered, duration of postoperative hospitalization, tumor recurrence, date of tumor recurrence, location of recurrence, neoadjuvant chemotherapy, date of commencement of neoadjuvant chemotherapy, patient's outcome (alive or dead), date of demise, and date of the last follow-up.

2.1. Surgical Procedure and Follow-Up

Prior to surgery, all patients underwent endoscopic resection of the bladder with histopathology for the diagnosis of bladder cancer. All the patients also underwent anteroposterior computed tomography of the thorax, abdomen, and pelvis.

On histopathology, all the patients were found to have cancer that was at least at stage T2 or carcinoma in situ. The patients performed laboratory tests such as complete blood counts, prothrombin time, Kaolin-cephalin time, and urinalysis before surgery. All patients were put under general anesthesia. A central intravenous line was placed in all patients. After inserting the trocars and insufflating the abdominal cavity at a pressure of 15 mmHg, the pre-rectal space was dissected via an upper peritoneal incision that spanned the length of the ureters up to the deep inguinal ring. Bilateral ilio-obturator lymphadenectomy was performed, after which the ureters were sectioned. During surgery, lymphadenectomy was performed in all the patients. The uterus and vagina were preserved during this procedure in women, and cystoprostatectomy with preservation of blood vessels and nerves was performed in male patients who had erections before the surgical operation. A mini-laparotomy with a short median incision measuring 4 - 5 cm that enables the extraction of the resected tissues, lymph node dissection, and Bricker's ileal conduit urinary diversion, was performed on 10 patients. Radical cystectomy with the construction of an orthotopic bladder (Studer's operation) was performed in two patients. Studer's operation was performed in our youngest patients who did not agree after surgery, the patients were hospitalized and a second histopathological analysis was performed for each of them. They were monitored for recurrence thereafter, and adjuvant chemotherapy was administered in those who had metastases. The positions of ports before the laparoscopic procedure and the appearance of the urinary diversion at the end of the procedure are shown in **Figure 2**.

The appearance of the collection bag around the stoma and a laparoscopic cystectomy specimen is shown in **Figure 3**.

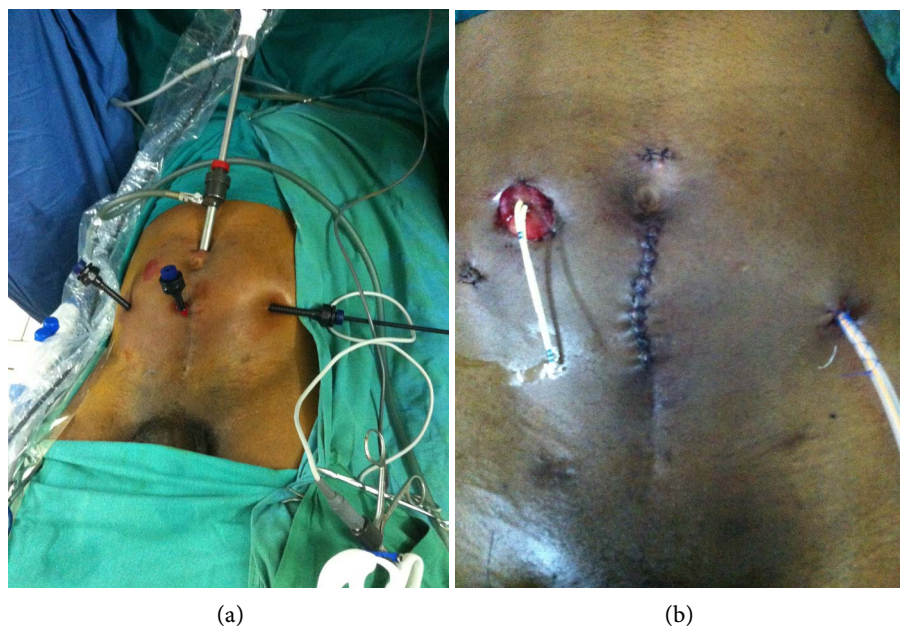


Figure 2. (a): Positions of the ports before the procedure; (b): Appearance of the urinary diversion at the end of the procedure.

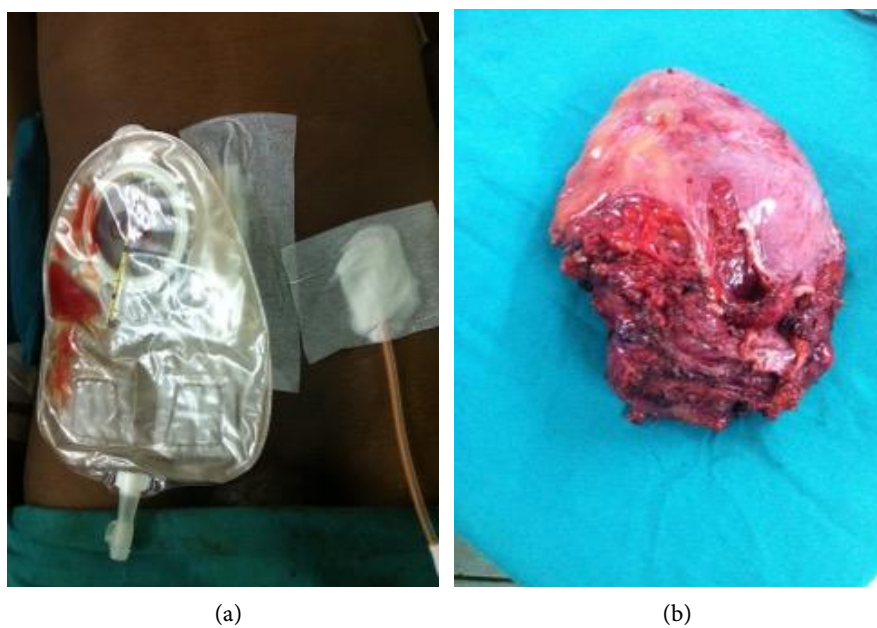


Figure 3. (a): Collecting bag around the stoma; (b): Laparoscopic cystectomy specimen.

2.2. Data Management

All data obtained from the patients and their clinical records were entered into Microsoft Excel 2016 and exported to Epi info 7 for analysis. Continuous data were presented as mean values and standard deviations for normally distributed data and as median values with interquartile ranges for skewed data. Categorical variables were presented as frequencies and percentages. Overall survival, progression-free survival, and cancer-specific survival were determined via Kaplan-Meier analysis. Values of $p < 0.05$ were considered statistically significant.

2.3. Ethical Approval

This study was approved by the institutional review board of the Faculty of Medicine and Pharmaceutical Sciences of the University of Douala and the ethics committee of the *Centre medico-chirurgicale d'urologie* in Douala. We also obtained each patient's written informed consent prior to their participation in the study.

3. Results

We included a total of 12 patients (ten men and two women) aged 32 years to 75 years with a median age of 61.5 [52.8 - 68.5] years. The tumor diameters ranged from 2 cm to 5 cm, with a mean diameter of 3.75 ± 1.06 cm. The tumors were located at the right lateral surface of the kidney in 3 (25%) patients, at the left lateral surface of the kidney in 2 (16.67%) patients, and at both lateral surfaces, the dome of the kidney, bladder neck/prostatic urethra, bladder neck/anterior surface of the kidney, left lateral surface/anterior surface of the kidney, right meatus/right lateral surface, and left meatus/left pelvis in one (8.33) patient each.

Four (33.33%) of the twelve patients received neoadjuvant chemotherapy. According to the preoperative histological findings, six (50%) patients had tumors of grade pT2G3N0M0, three (25%) had tumors of grade pT2G2N0M0, two (16.67%) had tumors of grade pT3G2N1M0, and one (8.33%) had tumors of grade pT2G3N1M0. According to the classification of the American Society of Anesthesiologists (ASA), six (50%) patients belonged to grade 3, five (41.67%) belonged to grade 2, and one (8.33%) belonged to grade 1. The sociodemographic and preoperative details of the study participants are presented in **Table 1**.

Table 1. Sociodemographic and preoperative details of the study participants.

VARIABLE	FREQUENCY (%)
Sex	
Male	10 (83.33)
Female	2 (16.67)
Age (years)	
≤60	6 (50)
>60	6 (50)
Tumor size (cm)	
≤3	6 (50)
>3	6 (50)
Neoadjuvant chemotherapy	
Yes	4 (33.33)
No	8 (66.67)
Postoperative histology	
pT2G3N0M0	6 (50)
pT2G2N0M0	3 (25)
pT3G2N1M0	2 (16.67)
pT2G3N1M0	1 (8.33)
ASA classification	
Grade 3	6 (50)
Grade 2	5 (41.67)
Grade 1	1 (8.33)
Tumor location	
Right lateral surface of the bladder	3 (25)
Left lateral surface of the bladder	2 (16.67)
Both lateral surfaces of the bladder	1 (8.33)
Dome of the bladder	1 (8.33)
Bladder neck/prostatic urethra	1 (8.33)
Bladder neck/anterior surface of the bladder	1 (8.33)
Left lateral surface/anterior surface of the bladder	1 (8.33)
Right meatus/right lateral surface	1 (8.33)
Left meatus/left pelvis	1 (8.33)

All patients were put under general anesthesia during surgery. The surgery duration ranged from 180 minutes to 305 minutes with a mean duration of 242.08 ± 45.85 minutes. Blood vessels and nerves were preserved in 4 (33.33%) of the participants. The estimated blood loss during surgery ranged from 175 ml to 620 ml with a median value of 325 [260 - 465] ml. The resected cancerous tissues underwent histopathological analyses. The type of cancer identified was transitional cell carcinoma in 10 (83.33%) and epidermoid carcinoma in 2 (16.67%) cases. According to the histological classification, four (33.33%) patients had cancers of type pT2G3N0M0, three (25%) had cancers of type pT2G2N0M0, two (16.67%) had tumors of type pT3G2N1M0, and one each (8.33%) had tumors of grades pT3G2N1M0, pT3G3N1M1, and pT2G1N0M0. Four patients (33.33%) had metastases. These metastases were located in the ganglions only in three (75%) patients and in the ganglions and prostate in one (25%) patient. Bricker's ileal conduit urinary diversion was performed in 10 (83.33%) patients while the Studer neobladder was used in two (16.67%) patients. The operative details of the study participants are presented in **Table 2**.

The duration of hospitalization ranged from 5 days to 10 days with a mean duration of 6 ± 1.48 days. Only one (8.33%) patient had a postoperative complication, which was rectal perforation. Two (16.67%) patients experienced a recurrence of the condition, and both of them ended up dying. The time-lapse till recurrence was 225 days in one patient and 256 days in the other, which gives a mean time-lapse of 240.5 ± 21.92 days. Three (25%) patients received adjuvant chemotherapy. Normally, all four patients with metastases were supposed to receive adjuvant chemotherapy; however, one of them had a poor general state that represented a contraindication to adjuvant chemotherapy. This particular patient died not long after. Six (50%) patients ended up dying while the other six (50%) survived. The follow-up duration for the deceased patients ranged from 200 days to 494 days with a median value of 278 [202 - 326] days. For those who survived, the follow-up duration ranged from 390 days to 2183 days with a median duration of 715 [478 - 1727] days. The postoperative details of the study participants are presented in **Table 3**.

Kaplan-Meier survival analyses revealed that the median overall survival was 486 days one-year overall survival rate was 58.33% while the five-year overall survival rate was 46.47%. The overall survival curve is presented in **Figure 4**.

4. Discussion

This study aimed to evaluate the oncologic results and the place of laparoscopic cystectomy in the management of bladder cancer in a single urology center in Douala, Cameroon. We recruited ten patients with a median age of 61.5 [52.8 - 68.5] years, which is similar to the mean age of 69.4 years reported by Miyamoto and Epstein [8]. This similarity is explained by the fact that bladder cancer is a condition that occurs in older people, and muscle-invasive bladder cancer usually occurs in people of that age group. The mean tumor diameter in our

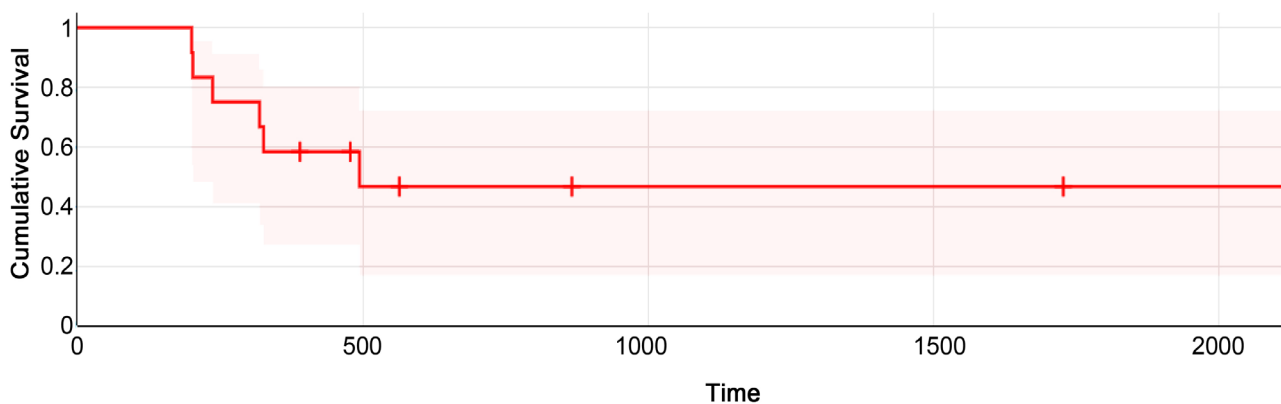
Table 2. Operative details of the study participants.

VARIABLE	FREQUENCY (%)
Surgery duration (minutes)	
≤240	6 (50)
>240	6 (50)
Preservation of blood vessels and nerves	
Yes	4 (33.33)
No	8 (66.67)
Estimated blood loss (ml)	
≤300	6 (50)
>300	6 (50)
Type of cancer	
Transitional cell carcinoma	10 (83.33)
Epidermoid carcinoma	2 (16.67)
Preoperative histology	
pT2G3N0M0	4 (33.33)
pT2G2N0M0	3 (25)
pT3G2N1M0	2 (16.67)
pT3G2N1M0	1 (8.33)
pT3G3N1M1	1 (8.33)
pT2G1N0M0	1 (8.33)
Metastasis	
Yes	4 (33.33)
No	8 (66.67)
Locations of metastases	
Ganglions only	3 (75)
Ganglions and prostate	1 (25)
Type of urinary diversion	
Bricker	10 (83.33)
Studer	2 (16.67)

study was 3.75 ± 1.06 cm, which is in line with the findings of Tully *et al.* who reported having more tumors with diameters of more than 3 cm than those with diameters of less than 3 cm in their study [9]. This large tumor was expected since bladder tumors are usually not muscle-invasive at the onset. With time, they grow and invade the bladder muscle, at which point their dimensions are higher. Ten (83.33%) of the patients in our study had transitional cell carcinoma, which is expected as this histological type reportedly accounts for 95% of all bladder cancers [10]. Four patients (33.33%) had metastases. This is higher than the 10% - 15% reported by Park *et al.* in 2014 [11]. The percentage reported by Park *et al.* is lower because it applies only to cases in which the tumor is recurring whereas our percentage applies to all cases. Also, Park *et al.* recruited more

Table 3. Postoperative details of the study participants.

VARIABLE	FREQUENCY (%)
Duration of hospitalization (days)	
≤5	6 (50)
>5	6 (50)
Postoperative complication	
Yes	1 (8.33)
No	11 (91.67)
Recurrence	
Yes	2 (16.67)
No	10 (83.33)
Time-lapse till recurrence (days)	
225	1 (50)
256	1 (50)
Survival	
Yes	6 (50)
No	6 (50)
Time-lapse till demise (days)	
≤300	3 (50)
>300	3 (50)
Follow-up duration of survivors (days)	
≤1000	4 (66.67)
>1000	2 (33.33)

Survival Function (S_t) - with confidence interval**Figure 4.** Kaplan-Meier survival curve.

patients than we did in our study, which makes their findings likely to differ from ours. Three patients (25%) received adjuvant chemotherapy. Normally, all four patients with metastases were supposed to receive adjuvant chemotherapy;

however, one of them had a poor general state that represented a contraindication to adjuvant chemotherapy. The median estimated blood loss in our study was 325 [260 - 465] ml, which is lower than the mean value of 249.69 ± 95.59 milliliters reported by Aboumarzouk *et al.* in 2012 [5]. This difference is probably due to the fact that Aboumarzouk *et al.* carried out their study at a specialized center where such laparoscopic procedures are carried out regularly and by the same surgeon over five years, which means the surgeon and surgical team in their study were probably more experienced than those in our study considering how rarely this procedure is performed in our setting. As such, they were capable of carrying out these procedures with less blood loss. The mean surgery duration in our study was 242.08 ± 45.85 minutes, which is higher than the 166 minutes reported by Simonato *et al.* in 2003 [12]. The difference can be explained by the fact that Simonato *et al.* performed six orthotopic ileal neobladders, two sigmoid ureterostomies, and two cutaneous ureterostomies, whereas we carried out ten Bricker's ileal conduit urinary diversions, which is a technique that takes significantly longer, out of our twelve surgical procedures. The mean postoperative hospital stay in our study was 6 ± 1.48 days, which is similar to the overall mean value of 7 days reported by Simonato *et al.* [12]. This similarity can be explained by the fact that they, just like us, recruited a small number of patients (ten patients compared to our twelve) and had a minimal rate of postoperative complications. The absence of major postoperative complications, which is generally a feature of laparoscopic surgery, allows for short postoperative hospitalization durations. The five-year overall survival rate in our study was 46.47%, which is higher than the three-year survival rate of 40% reported by Çelen *et al.* in 2020 [13]. This difference is due to the fact that Çelen *et al.* carried out their study on patients with more advanced bladder cancer (stages T3 and T4); as such, the overall survival of the patients in their study was expected to be lower than that of patients in our study.

The main limitation of our study was its small sample size, which is probably due to the fact that laparoscopic surgery has not yet been fully integrated into daily medical practice in our setting. As such, patients with such conditions tend to opt for open surgery as they still regard laparoscopic surgery as being experimental. We recommend that more studies with larger samples be carried out on this topic in the future to further investigate our findings.

5. Conclusion

Laparoscopic cystectomy is a mini-invasive technique associated with good cancer control. When performed by well-trained staff using specialized equipment, it can be a safe and effective method of managing muscle-invasive bladder cancer.

Acknowledgements

The authors thank Health Search Association for their contribution to this work.

Funding

The authors did not receive any external funding for this study.

Conflict of Interest Statement

The authors have no conflicting interests to declare.

References

- [1] Manoharan, M. and Ayyathurai, R. (2007) Radical Cystectomy for Urothelial Cancer of the Bladder: Contemporary Advances. *The Italian Journal of Urology and Nephrology*, **59**, 99-107.
- [2] Perera, M., McGrath, S., Sengupta, S., Crozier, J., Bolton, D. and Lawrentschuk, N. (2018) Pelvic Lymph Node Dissection during Radical Cystectomy for Muscle-Invasive Bladder Cancer. *Nature Reviews Urology*, **15**, 686-692. <https://doi.org/10.1038/s41585-018-0066-1>
- [3] Huang, G.J. and Stein, J.P. (2007) Open Radical Cystectomy with Lymphadenectomy Remains the Treatment of Choice for Invasive Bladder Cancer. *Current Opinion in Urology*, **17**, 369-375. <https://doi.org/10.1097/MOU.0b013e3282dc95b5>
- [4] Zheng, W., Li, X., Song, G., Zhang, Z., Yu, W., Gong, K., *et al.* (2012) Comparison of Laparoscopic and Open Cystectomy for Bladder Cancer: A Single Center of 110 Cases Report. *Translational Andrology and Urology*, **1**, 4-8.
- [5] Aboumarzouk, O.M., Drewa, T., Olejniczak, P. and Chlosta, P.L. (2012) Laparoscopic Radical Cystectomy: A 5-Year Review of a Single Institute's Operative Data and Complications and a Systematic Review of the Literature. *International Brazilian Journal of Urology*, **38**, 330-340. <https://doi.org/10.1590/S1677-55382012000300006>
- [6] Ríos González, E., López-Tello García, J.J. and Martínez-Piñeiro Lorenzo, L. (2009) Laparoscopic Radical Cystectomy. *Clinical and Translational Oncology*, **11**, Article Number: 799. <https://doi.org/10.1007/s12094-009-0448-1>
- [7] Nosov, A.K., Reva, S.A., Dzhililov, I.B., Petrov, S.B. (2015) Laparoscopic and Open Radical Cystectomy for Bladder Cancer. *Voprosy Onkologii*, **61**, 352-361.
- [8] Miyamoto, H. and Epstein, J.I. (2010) Transurethral Resection Specimens of the Bladder: Outcome of Invasive Urothelial Cancer Involving Muscle Bundles Indeterminate between Muscularis Mucosae and Muscularis Propria. *Urology*, **76**, 600-602. <https://doi.org/10.1016/j.urology.2009.12.080>
- [9] Tully, K.H., Moschini, M., von Rundstedt, F.-C.E., Aziz, A., Kluth, L.A., Necchi, A., *et al.* (2020) Impact of Tumor Size on the Oncological Outcome of High-Grade Nonmuscle Invasive Bladder Cancer: Examining the Utility of Classifying Ta Bladder Cancer Based on Size. *Urologic Oncology*, **38**, 851.e19-851.e25. <https://doi.org/10.1016/j.urolonc.2020.06.034>
- [10] Al-Husseini, M.J., Kunbaz, A., Saad, A.M., Santos, J.V., Salahia, S., Iqbal, M., *et al.* (2019) Trends in the Incidence and Mortality of Transitional Cell Carcinoma of the Bladder for the Last Four Decades in the USA: A SEER-Based Analysis. *BMC Cancer*, **19**, 46. <https://doi.org/10.1186/s12885-019-5267-3>
- [11] Park, J.C., Citrin, D.E., Agarwal, P.K. and Apolo, A.B. (2014) Multimodal Management of Muscle Invasive Bladder Cancer. *Current Problems in Cancer*, **38**, 80-108. <https://doi.org/10.1016/j.currproblcancer.2014.06.001>
- [12] Simonato, A., Gregori, A., Lissiani, A., Bozzola, A., Galli, S. and Gaboardi, F. (2003)

Laparoscopic Radical Cystoprostatectomy: A Technique Illustrated Step by Step. *European Urology*, **44**, 132-138. [https://doi.org/10.1016/S0302-2838\(03\)00214-8](https://doi.org/10.1016/S0302-2838(03)00214-8)

- [13] Çelen, S., Kaygısız, O., Vuruşkan, H. and Yavaşcaoğlu, İ. (2020) Laparoscopic versus Open Radical Cystectomy in the Treatment of Locally Advanced T3 and T4 Bladder Cancer: Perioperative and Mid-Term oncological Outcomes. *Turkish Journal of Urology*; **46**, 123-128. <https://doi.org/10.5152/tud.2020.19077>